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## NOTICE OF ALLOWANCE AND FEE(S) DUE

23685 7590 03/29/2004

KRIEGSMAN & KRIEGSMAN  
665 FRANKLIN STREET  
FRAMINGHAM, MA 01702

EXAMINER

STOCK JR, GORDON J

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 03/29/2004

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/579,593	05/26/2000	Joseph J. Danko	81329A	8869

TITLE OF INVENTION: METHOD AND APPARATUS FOR INSPECTING A PATTERNED SEMICONDUCTOR WAFER

APPLN. TYPE	SMALL ENTITY	ISSUE FEE	PUBLICATION FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1330	\$0	\$1330	06/29/2004

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE REFLECTS A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE APPLIED IN THIS APPLICATION. THE PTOL-85B (OR AN EQUIVALENT) MUST BE RETURNED WITHIN THIS PERIOD EVEN IF NO FEE IS DUE OR THE APPLICATION WILL BE REGARDED AS ABANDONED.

### HOW TO REPLY TO THIS NOTICE:

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If the SMALL ENTITY is shown as NO:

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B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check the box below and enclose the PUBLICATION FEE and 1/2 the ISSUE FEE shown above.

☐ Applicant claims SMALL ENTITY status.  
See 37 CFR 1.27.

II. PART B - FEE(S) TRANSMITTAL should be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). Even if the fee(s) have already been paid, Part B - Fee(s) Transmittal should be completed and returned. If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

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Complete and send this form, together with applicable fee(s), to: Mail

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CURRENT CORRESPONDENCE ADDRESS (Note: Legibly mark-up with any corrections or use Block 1)

23685 7590 03/29/2004

**KRIEGSMAN & KRIEGSMAN**  
**665 FRANKLIN STREET**  
**FRAMINGHAM, MA 01702**

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I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

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09/579,593	05/26/2000	Joseph J. Danko	81329A	8869

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nonprovisional	NO	\$1330	\$0	\$1330	06/29/2004

EXAMINER	ART UNIT	CLASS-SUBCLASS
STOCK JR, GORDON J	2877	356-237400

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

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## **3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)**

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(A) NAME OF ASSIGNEE

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Please check the appropriate assignee category or categories (will not be printed on the patent); ☐ individual ☐ corporation or other private group entity ☐ government

## **4a. The following fee(s) are enclosed:**

- ☐ Issue Fee
- ☐ Publication Fee
- ☐ Advance Order - # of Copies \_\_\_\_\_

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- ☐ A check in the amount of the fee(s) is enclosed.
- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☐ The Director is hereby authorized by charge the required fee(s), or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

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(Date)

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This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Alexandria, Virginia 22313-1450. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS.** SEND TO: Commissioner for Patents, Alexandria, Virginia 22313-1450.

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23685	7590	03/29/2004		
KRIEGSMAN & KRIEGSMAN 665 FRANKLIN STREET FRAMINGHAM, MA 01702			EXAMINER STOCK JR, GORDON J	
			ART UNIT 2877	PAPER NUMBER

DATE MAILED: 03/29/2004

## Determination of Patent Term Extension under 35 U.S.C. 154 (b) (application filed after June 7, 1995 but prior to May 29, 2000)

The Patent Term Extension is 0 day(s). Any patent to issue from the above-identified application will include an indication of the 0 day extension on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Extension is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) system (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (703) 305-1383. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at (703) 305-8283.

# Notice of Allowability

Application No.

09/579,593

Examiner

Gordon J Stock

Applicant(s)

DANKO, JOSEPH J.

Art Unit

2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to correspondence filed on 3/4/04.
2. ☒ The allowed claim(s) is/are 1-14 and 19-21.
3. ☐ The drawings filed on \_\_\_\_\_ are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
  - \* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☒ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☒ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☒ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 1/30/03.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

## Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☒ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☒ Other PTOL-413B attached.

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Irving Kriegsman on March 15, 2004.

After an updated search, Examiner found U.S. Patent 6,288,780 to Fairley et al. read on claims 1, 3, and 19 (of after final amendment of March 4, 2004). Particularly, there was the potential of a 35 U.S.C. 102(e) rejection with respect to claims 1 and 3 and a 35 U.S.C. 103(a) rejection in view of U.S. Patent 6,091,488 to Bishop for claim 19. Thereby, the Examiner initiated an interview with attorney (see PTOL-413B attached). Examiner suggested cancellation of claims; however, attorney suggested amending of claims 1, 3, and 19 to overcome the possible rejections in regards to the Fairley reference and any other prior art by amending claims 1, 3, and 19 to have the claims read in regards to a single light source rather than possibly reading as two separate light sources producing two beams of light. Examiner agreed with a proposed amendment and agreed that the proposed amendment to the claims 1, 3, and 19 overcame any possible rejection with regards to U.S. Patent 6,288,780 to Fairley et al. and was made allowable over the prior art. Examiner agreed that the approved proposed amendment to claims 1, 3, and 19 would be made by Examiner's amendment. So after final amendment of March 4, 2004 will be entered; claims 1, 3, and 19 will be amended by Examiner's Amendment.

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In addition, Examiner has made a correction to claim 3 due to a typographical error: line 1 should read --contaminant-- rather than "contaminate." And a correction to claim 19 due to a typographical error has been made: line 7 should read --from-- rather than "form."

The amended claims showing corrections are:

1.(currently amended) An apparatus for detecting the presence of contaminant particles on a surface of a semiconductor wafer having repetitive patterns, said apparatus comprising:

(a) means for producing a first beam of light and a second beam of light, said means comprising a laser for producing a beam of laser light and a beamsplitter for splitting up the beam of laser light into said first beam of light and said second beam of light,

(b) first optical means for illuminating a first region area on the semiconductor wafer with said first beam of light,

(c) second optical means for illuminating a second region on the semiconductor wafer sample with said second beam of light,

(d) said first beam of light striking the semiconductor wafer at a first approach angle which is angularly adjustable and a first angle of incidence which is angularly adjustable,

(e) said second beam of light striking the semiconductor wafer at a second approach angle which is angularly adjustable and a second angle of incidence which is angularly adjustable,

(f) said first approach angle and said first angle of incidence being adjustable independent of said second approach angle and said second angle of incidence, respectively,

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(g) an imaging detector disposed above the semiconductor wafer for detecting light scattered from the area illuminated but not specularly reflected light,

(h) an imaging lens for imaging said area illuminated on said imaging detector, said imaging lens having a Fourier plane, and

(i) a spatial filter in the Fourier plane of the imaging lens for masking off the diffraction pattern produced by the background on the semiconductor wafer from each one of the two illuminating beams of light.

3.(currently amended) A method for detecting the presence of [contaminate] contaminant particles on a semiconductor wafer having repetitive patterns, said apparatus comprising:

(a) illuminating a portion of the semiconductor wafer with first and second beams of light originating from a single light source,

(b) said first beam of light striking the semiconductor wafer at a first approach angle which is angularly adjustable and a first angle of incidence which is angularly adjustable,

(c) said second beam of light striking the semiconductor wafer at a second approach angle which is angularly adjustable and a second angle of incidence which is angularly adjustable,

(d) said first approach angle and said first angle of incidence being adjustable independent of said second approach angle and said second angle of incidence, respectively,

(e) adjusting said first and second approach angles to minimize background scatter,

(f) positioning an imaging detector above the semiconductor wafer for detecting at least some of the light scattered from the area illuminated but not specularly reflected light,

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(g) providing an imaging lens for imaging said area illuminated on said imaging detector, said imaging lens having a Fourier plane,

(h) providing a spatial filter in the Fourier plane on the imaging lens for masking off the diffraction pattern produced by the background on the semiconductor wafer from a first one of the two beams of light, and

(i) adjusting said angle of incidence of the other beam of light so that the diffraction pattern formed by the other beam of light in the Fourier plane overlaps the diffraction pattern formed by the first beam of light.

19.(currently amended) A method for detecting the presence of contaminant particles on a semiconductor wafer having repetitive patterns, said method comprising:

(a) illuminating a pair of intersecting stripe shaped regions on the semiconductor wafer, using a pair of beams of light originating from a single light source, each beam of light having an approach angle and an angle of incidence that is angularly adjustable independent of the approach angle and angle of incidence of the other beam of light, and

(b) detecting at least some of the light scattered [form] from the area illuminated but not specularly reflected light as said semiconductor wafer is moving using a lens and CCD camera having a square array sensor and operational in a time delayed integration mode.

***Allowable Subject Matter***

2. **Claims 1-14, and 19-21** are allowed.

3. The following is an examiner's statement of reasons for allowance:



As to **claim 1**, the prior art of record, taken alone or in combination, fails to disclose or render obvious the first approach and incident angles being adjustable independent of second approach and incident angles limitation in an apparatus for detecting the presence of contaminant particles on a semiconductor wafer and means for producing a first beam of light and a second beam of light, said means comprising a laser for producing a beam of laser light and a beamsplitter for splitting up the beam of laser light into said first beam of light and said second beam of light, in combination with the rest of the limitations of **claim 1**.

As to **claim 2**, the prior art of record, taken alone or in combination, fails to disclose or render obvious the first approach and incident angles being adjustable independent of second approach and incident angles limitation and the angularly movable first and second tower limitations in an apparatus for detecting the presence of contaminant particles on a semiconductor wafer, in combination with the rest of the limitations of **claim 2**.

As to **claim 3**, the prior art of record, taken alone or in combination, fails to disclose or render obvious the first approach and incident angles being adjustable independent of second approach and incident angles limitation in a method for detecting the presence of contaminant particles on a semiconductor wafer and illuminating a portion of the semiconductor wafer with first and second beams of light originating from a single light source, in combination with the rest of the limitations of **claim 3**.

As to **claim 4**, the prior art of record, taken alone or in combination, fails to disclose or render obvious the first approach and incident angles being adjustable independent of second approach and incident angles limitation in an apparatus for detecting the presence of contaminant particles on a semiconductor wafer, in combination with the rest of the limitations of **claim 4**.

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As to **claim 5**, the prior art of record, taken alone or in combination, fails to disclose or render obvious the first and second tower being angularly movable limitations in an apparatus for detecting the presence of contaminant particles on a semiconductor wafer, in combination with the rest of the limitations of **claims 5-10**.

As to **claim 11**, the prior art of record, taken alone or in combination, fails to disclose or render obvious a light source adapted to produce a first beam of light and a second beam of light; a first approach angle which is angularly adjustable; a second approach angle which is angularly adjustable; a CCD camera being operational in a time delayed integration mode in an apparatus for detecting the presence of contaminant particles on a surface of a semiconductor wafer having repetitive patterns, in combination with the rest of the limitations of **claims 11-14, 20 and 21**.

Examiner would like to mention that **claims 20-21** were inadvertently overlooked in prior office action (see action of September 9, 2003) due to **claims 20-21** images not being indexed with the rest of the claims' images in correspondence of June 5, 2003. However, claims 20-21 depend from an allowed base claim. Therefore, they would have been allowed in the prior office action of September 9, 2003. Examiner apologizes for any inconvenience.

As to **claim 19**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a method for detecting the presence of contaminant particles on a semiconductor wafer having repetitive patterns illuminating a pair of intersecting stripe shaped regions on the semiconductor wafer, using a pair of beams of light originating from a single light source, each beam of light having an approach angle and an angle of incidence that is angularly adjustable independent of the approach angle and angle of incidence of the other beam of light, in combination with the rest of the limitations of **claim 19**.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

U.S. Patent 6,366,352 to Goldberg et al.

U.S. Patent 6,587,193 to Reinhron et al.

### ***Fax/Telephone Numbers***

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

*Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (703) 872-9306*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431. The examiner can normally be reached on Monday-Friday, 8:00 a.m. - 4:30 p.m.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Application/Control Number: 09/579,593

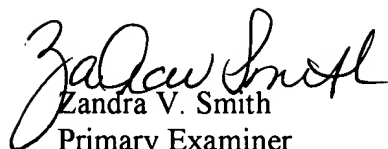
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March 15, 2004



Zandra V. Smith

Primary Examiner

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